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Polymer enhanced ultrafiltration of mercury using chitosan impregnated ceramic membrane

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ABSTRACT

This work reports the removal of mercury from synthetic wastewater by polymer enhanced ultrafiltration (PEUF). A ceramic membrane was prepared from locally available clay and the membrane surface was impregnated using chitosan to reduce the pore size to ultrafiltration range. The average pore size of the membrane was determined from air permeability data and found to be 12 nm. Polyvinyl alcohol (PVA) was used as the chelating agent. The effects of PVA dose, mercury concentration, pH and transmembrane pressure on mercury rejection were investigated. Rejection increased with the increase of PVA dose and decreased with the increase of initial mercury concentration and transmembrane pressure. The maximum rejection of mercury and PVA was found to be 85% and 99.7% respectively. The optimum pH for the operation was also determined. The flux declination rate was observed to be more at higher PVA dose and less at higher pressure. A preliminary membrane cost estimation approach was adopted based on the manufacturing cost of raw materials and reported.

Keywords: Ceramic membrane; Mercury removal; Polymer enhanced ultrafiltration; Water treatment

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